Proposed Plan for
Solid Waste Management Unit (SWMU) Site M-26
Engineer Proving Ground
Fort Belvoir, Virginia
January 2006

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1.0 PURPOSE

This Proposed Plan describes the preferred remedial alternative to address contamination at the Solid Waste Management Unit (SWMU) Site M-26 on the Engineer Proving Ground (EPG) at Fort Belvoir, Virginia. The primary purpose of this Proposed Plan is to inform the public of the preferred remedial alternative and facilitate public involvement in the remedy selection process. The U.S. Army is providing an opportunity for public comment on this Proposed Plan and thus solicits the views of the public on the preferred remedial alternative. Section 8 of this Proposed Plan provides the details on opportunities for community participation.

2.0 SITE BACKGROUND

The U.S. Army Garrison at Fort Belvoir is located in the Commonwealth of Virginia, 14 miles south of Washington, DC. EPG is an 820-acre tract located 1.5 miles northwest of the main post of Fort Belvoir and is roughly bounded on the east by Interstate 95 and by commercial and residential properties on the other three sides. Figure 1 illustrates the EPG property vicinity map.

Site M-26 is located near the southeastern corner of EPG approximately 1,000 feet south of Heller Loop and 1,000 feet east of the Accotink Creek. The location of Site M-26 within the EPG property is presented in Figure 2. The general site configuration is illustrated in Figure 3.

The preferred remedial action was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), their implementing regulations referred to as the National Contingency Plan (NCP), and Army Regulation 200-1, as applicable.

Site M-26 was first identified during a 1990 Environmental Baseline Study. According to information reported within the Environmental Baseline Study for EPG, authored by the US Army Toxic and Hazardous Materials Agency (USATHAMA), approximately 30,000 to 100,000 gallons of gasoline were released from an aboveground storage tank in August 1968. Although a protective berm was in place at the site, which apparently surrounded the tank area, the gasoline flowed over land to a nearby unnamed stream and into Accotink Creek. The gasoline was ignited and trees, structures, and the I-95 bridge over Accotink Creek were burned and destroyed. The area impacted by this spill is considered Site M-26.

The preferred remedial alternative to address Site M-26 is being proposed by the Army, with support from US EPA Region III (EPA) and Virginia Department of Environmental Quality (VDEQ).

3.0 SUMMARY OF SITE RISKS

Five investigations have occurred at this site over the past 15 years, designated phases A, B, C, D, and E. Phase A was performed by USATHAMA in 1990; Phase B by Environmental Restoration Company in 1995; Phase C by Earth Tech, Inc in 2001; Phase D by Conti/Dewberry in Spring 2005; and Phase E by Mactec in Summer 2005.

Petroleum impacted soil were identified during all five investigations. Low-level volatile organic compounds were detected in the soil samples collected from Site M-26. Liquid Phase Hydrocarbons (LPH) were not detected in any of the groundwater monitoring wells installed at Site M-26. Benzene has been detected above the 5 parts per billion Maximum Contaminant Level (MCL) for drinking water in groundwater samples collected from several monitoring wells at Site M-26. The groundwater in the area is not used as a source of drinking water. Under EPA guidance, however, exceedance of a MCL established under the Safe Drinking Water Act in potential drinking water may be used as the basis for taking a remedial action.

The Army is currently working with the Virginia Department of Transportation (VDOT) to transfer property rights for a portion of Site M-26. This right of way (ROW) proposed property transfer is necessary in order to allow VDOT to complete a section of the Fairfax County Parkway. For this reason the potential receptors of the contamination at Site M-26 include dermal and inhalation exposure pathways to construction workers as well as future industrial (e.g., administrative) workers.

A risk screening for Site M-26 was conducted by the US Army Center for Health Promotion and Preventive Medicine (CHPPM) based on soil and groundwater sampling data. CHPPM concluded that there should not be any potential health risk to construction workers working on the site.

Because an unnamed stream flows immediately west of Site M-26, the surface water and sediment were sampled and analyzed during the Phase III Environmental Investigation. Detections were compared to U.S. EPA Region III BTAG Freshwater Screening Benchmarks 2004 and the U.S. EPA Region III BTAG Freshwater Sediment Screening Benchmarks 2004 ecological risk screening values. Aluminum, barium, iron, and manganese concentrations detected in the surface water samples exceeded the surface water ecological screening values. However, these metal concentrations are comparable to the naturally occurring background concentrations detected in the groundwater across EPG. Toluene slightly exceeded the ecological screening level. Cobalt, iron, and manganese concentrations exceeded the freshwater sediment screening criteria. These metal concentrations are comparable to historical EPG background concentrations. The assessment thus indicated that

the chemicals detected in the surface water and sediment samples collected from the unnamed stream west of site M-26 do not pose a threat to ecological receptors.

4.0 PRELIMINARY REMEDIATION GOALS

Preliminary Remediation Goals (PRGs) are based on Applicable or Relevant and Appropriate Requirements (ARARs) and other readily available information. PRGs are refined into final contaminant-specific cleanup levels. The following PRGs have been suggested for this site:

- Attain the MCL of 5 parts per billion (ppb) for benzene in groundwater
- Remove soil that contains greater than 14 ppb benzene

5.0 SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives proposed for Site M-26 are:

Alternative 1: No Action.

Capital Costs: $0
Operations and Maintenance Costs: $0
Duration: Not applicable

CERCLA requires that a No Action alternative be evaluated at every site to establish a baseline for the comparison of other remedial alternatives. Under the no action alternative, all contamination at Site M-26 would be left in place, with no actions or controls implemented to protect human health or the environment. There are no costs estimated with this alternative.

Alternative 2: Land use controls and long term monitoring for natural attenuation.

Capital Costs: $75,000
Operations and Maintenance Costs: $690,000
Duration: 30 years

This action would include the construction of fencing around the Site M-26 area. A prohibition on all drinking water use from Site M-26 would be imposed until the MCL for benzene of 5 ppb is attained. Appropriate vapor intrusion prevention measures would also be required for new construction built over the Site M-26 area. These land use restrictions would be incorporated into real estate documents, including the deed, upon transfer of ownership from the federal government. The Army (or owner of property that is transferred) would regularly verify that there have been no violations of the land use limitations. This alternative would also include long term groundwater monitoring to evaluate whether benzene is attenuating to the MCL. The groundwater monitoring will also include monitoring for other semivolatiles and volatiles (See Table 1). The cost estimate of $765,000 for this remedial alternative was based on semiannual sampling of six monitoring wells.

Alternative 3: Soil removal, land use controls, and long term monitoring for natural attenuation.

Capital Costs: $850,000
Operations and Maintenance Costs: $715,000
Duration: 30 years

This action would consist of removal and disposal of contaminated soil above 14 ppb benzene, and regrading the site. A prohibition on all drinking water use from Site M-26 would be imposed until the MCL for benzene of 5 ppb is attained. These land use restrictions would be incorporated into real estate documents, including the deed, upon transfer of ownership from the federal government. The Army (or owner of property that is transferred) would regularly verify that there have been no violations of the land use limitations. With the removal of the elevated concentrations of benzene, the groundwater contaminant concentrations should naturally attenuate. This alternative would include long term groundwater monitoring to evaluate whether benzene is attenuating to the MCL. The groundwater monitoring will also include monitoring for other semivolatiles and volatiles (See Table 1). The cost estimate of $1.5 million dollars was based on the quarterly sampling of six monitoring wells.

6.0 EVALUATION OF ALTERNATIVES

Under CERCLA and the NCP, nine criteria are used to evaluate the remedial alternatives. These nine criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The first two criteria are threshold criteria, which are requirements that each alternative must meet. The next five criteria are balancing criteria which are used to weigh major trade-offs among alternatives. The last two criteria are modifying criteria, which will be fully considered only after public comment is received on the Proposed Plan.

The nine remedy selection criteria are:

- Overall Protection of Human Health and the Environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume Through Treatment
- Short-Term Effectiveness
- Implementability
- Cost
- State/Support Agency Acceptance
- Community Acceptance

1. Overall Protection of Human Health and the Environment

Alternatives 2 and 3 ensure protection of human health and the environment. Alternative 2 ensures protection of human health through land use controls, such as fencing, whereas the

primary focus of Alternative 3 is the removal of elevated soil contamination. Both address potential future drinking water concerns through monitored natural attenuation of the groundwater, and thus also address potential ecological concerns with possible groundwater discharges to the surface water/stream. Because the "no action" alternative may not be protective of human health and the environment, it was eliminated from consideration under the remaining eight criteria.

2. Compliance with ARARs

Alternatives 2 and 3 would meet their respective ARARs from Federal and State laws. The MCL for benzene may be considered a relevant and appropriate requirement for the groundwater. Since Alternative 3 involves disposal of contaminated soil, hazardous waste management requirements under RCRA may be applicable and wastes generated from the disturbance of the soil will be properly characterized and disposed of in accordance with RCRA. Risk-based screening levels for certain chemicals (see Table 1) will also be monitored as a "To Be Considered" category of guidance.

3. Long-term Effectiveness and Permanence

Alternatives 2 and 3 will maintain protection of human health and the environment over time. Because Alternative 3 involves permanent removal of elevated benzene concentrations, Alternative 3 is anticipated to be effective in a shorter period of time. Alternative 2 relies on land use controls (LUCs), monitoring of the LUCs would be necessary to ensure long-term effectiveness and permanence of Alternative 2. Alternative 3 would also require land use controls (LUCs), monitoring of the LUCs would be necessary to ensure long-term effectiveness and permanence of Alternative 3 until end goals are met.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Neither Alternative 2 or 3 utilize treatment for contaminated soil. Alternative 3 does reduce the mobility and volume of contaminants through removal. Both alternatives utilize natural processes to reduce the toxicity and mobility of contaminants in the groundwater.

5. Short-term Effectiveness

Because Alternative 3 involves removal of soil exceeding 14 ppb benzene, it is anticipated that Alternative 3 will attain the MCL for benzene in a shorter period of time than Alternative 2. For the same reason, Alternative 3 will also more quickly address any potential ecological concerns at the surface water stream from groundwater discharges. While Alternative 3 involves excavation of contaminated soils and thus presents a potential for short-term exposure, this short term exposure to the remediation worker will be mitigated through the use of respiratory protection and other appropriate personnel protective equipment such as coveralls and gloves.

6. Implementability

Both Alternatives are readily implementable.

7. Cost

Alternative 2 is estimated to cost $765,000 dollars. Alternative 3 is estimated to cost $1,565,000 dollars.

8. State/Support Agency Acceptance

Both EPA and VDEQ have expressed support for the preferred alternative.

9. Community Acceptance
Community acceptance of the preferred alternative will be evaluated after the public comment period ends.

7.0 PREFERRED ALTERNATIVE

The preferred alternative for Site M-26 is Alternative 3: soil removal, land use controls, and long-term groundwater monitoring for natural attenuation. The total cost of this action is estimated at $1.5 million dollars. While Alternative 3 is the most costly of the remedial alternatives, the permanent removal of elevated levels of benzene in the soil and the shorter time frame to achieve the MCL for benzene in the groundwater, make it the preferred alternative. The preferred alternative is protective of human health and the environment, would comply with ARARs, would be cost-effective, and is readily implementable. The preferred alternative can change in response to public comment.

8.0 COMMUNITY PARTICIPATION

The Army is soliciting public comment on the preferred remedial alternative. A thirty (30) day public comment period will occur from **January 20, 2006 to February 21, 2006**. The Army has published a notice of availability of this Proposed Plan in *The Washington Post*, and will hold a public meeting to discuss this Proposed Plan on **February 1, 2006** at 6:30 p.m. at the Fairfax County's South County Government Center, 8350 Richmond Highway, Alexandria, Virginia 22039, in the large conference room.

To submit comments on the Proposed Plan, please send them to:

Department of the Army
U.S. Army Garrison Fort Belvoir
Directorate of Public Works, Environmental and Natural Resource Division
Attn: Marcia Kicos
9430 Jackson Loop, Suite 107
Fort Belvoir, Virginia 20060-5116

Commments can also be submitted by Fax to (703) 806-0622, or provided orally at the public meeting.

The Army also encourages the public to review more detailed information about this site in the Administrative Record located at the following locations:

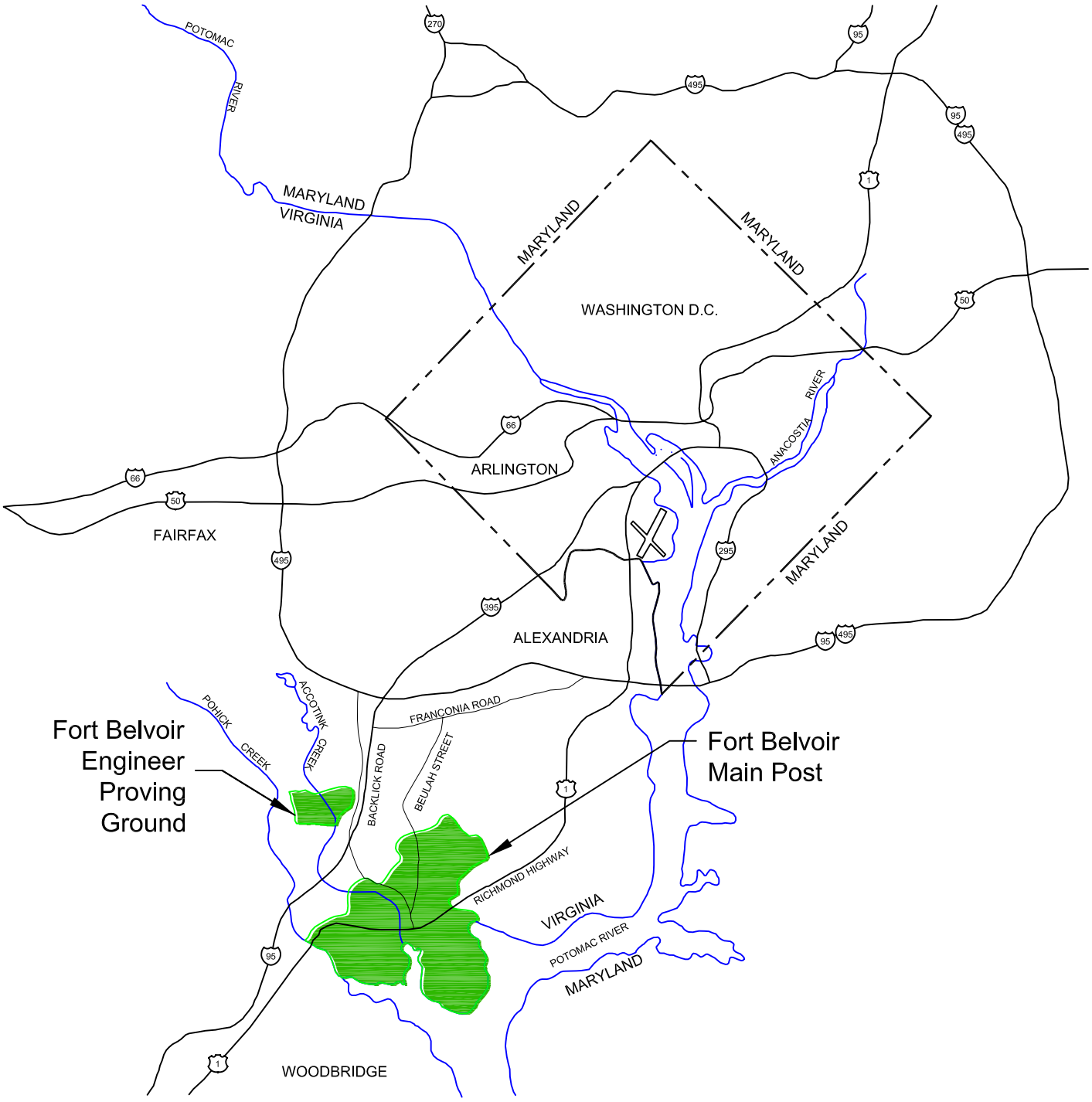
Kingstowne Library
6500 Landsdowne Centre
Alexandria, VA 22315-5011
Telephone: 703-339-4610

Lorton Library
9520 Richmond Highway
Lorton, VA 22079-2124
Telephone: 703-339-7385

Table 1 – EPA Region III Risk-Based Concentrations Tap Water (ug/L)

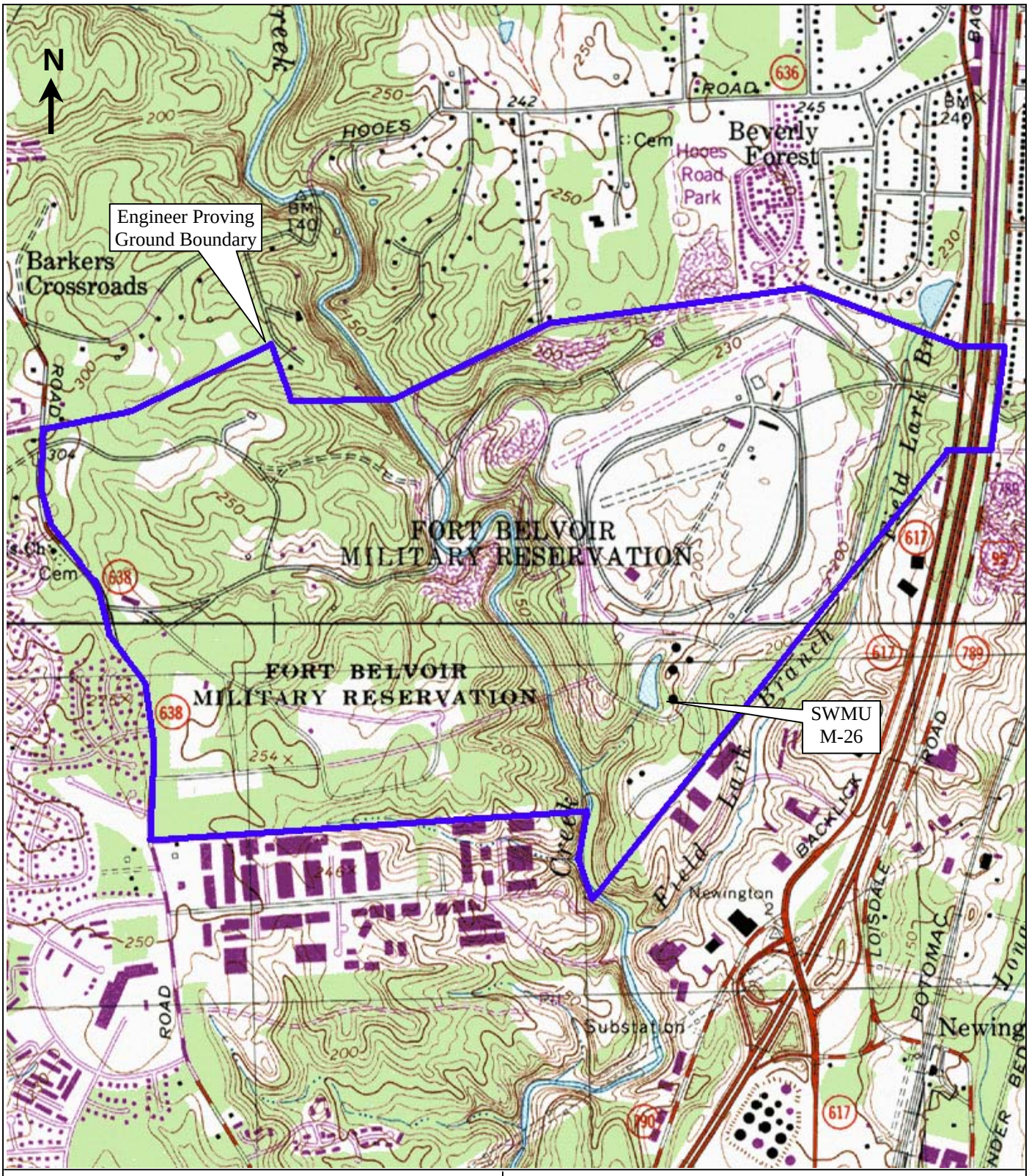
VOCs:	
2-Butanone	7,000
Acetone	5,500
Carbon Disulfide	1,000
Chloromethane	190
Cyclohexane	12,000
Ethylbenzene	1,300
Isopropylbenzene	660
Methyl Acetate	6,100
Methylcyclohexane	6,300
Methylene Chloride	4.1
Xylenes, Total	210
cis-1,2-Dichloroethene	55
SVOCs:	
1-1,Biphenyl	300
2-Methylnapthalene	24
Acetophenone	610
Benzaldehyde	3,700
Napthalene	6.5
bis(2-ethylhexyl)phthalate	4.8

FIGURE 1
SITE VICINITY MAP



Tetra Tech, Inc. **10306 Eaton Pl., Suite 340** **Fairfax, VA 22030** **703.385.6000**	***Site Vicinity Map*** **Fort Belvoir, Virginia**	
	Not to Scale	**Figure 1**

FIGURE 2
SOLID WASTE MANAGEMENT UNIT (SWMU) M-26 LOCATION



Sources:
USGS, 1965. Annandale, VA Quadrangle.
Photorevised 1983, 1994.
USGS, 1965. Fort Belvoir, VA – MD Quadrangle.
Photorevised 1980.

Site Location and Topographic Map

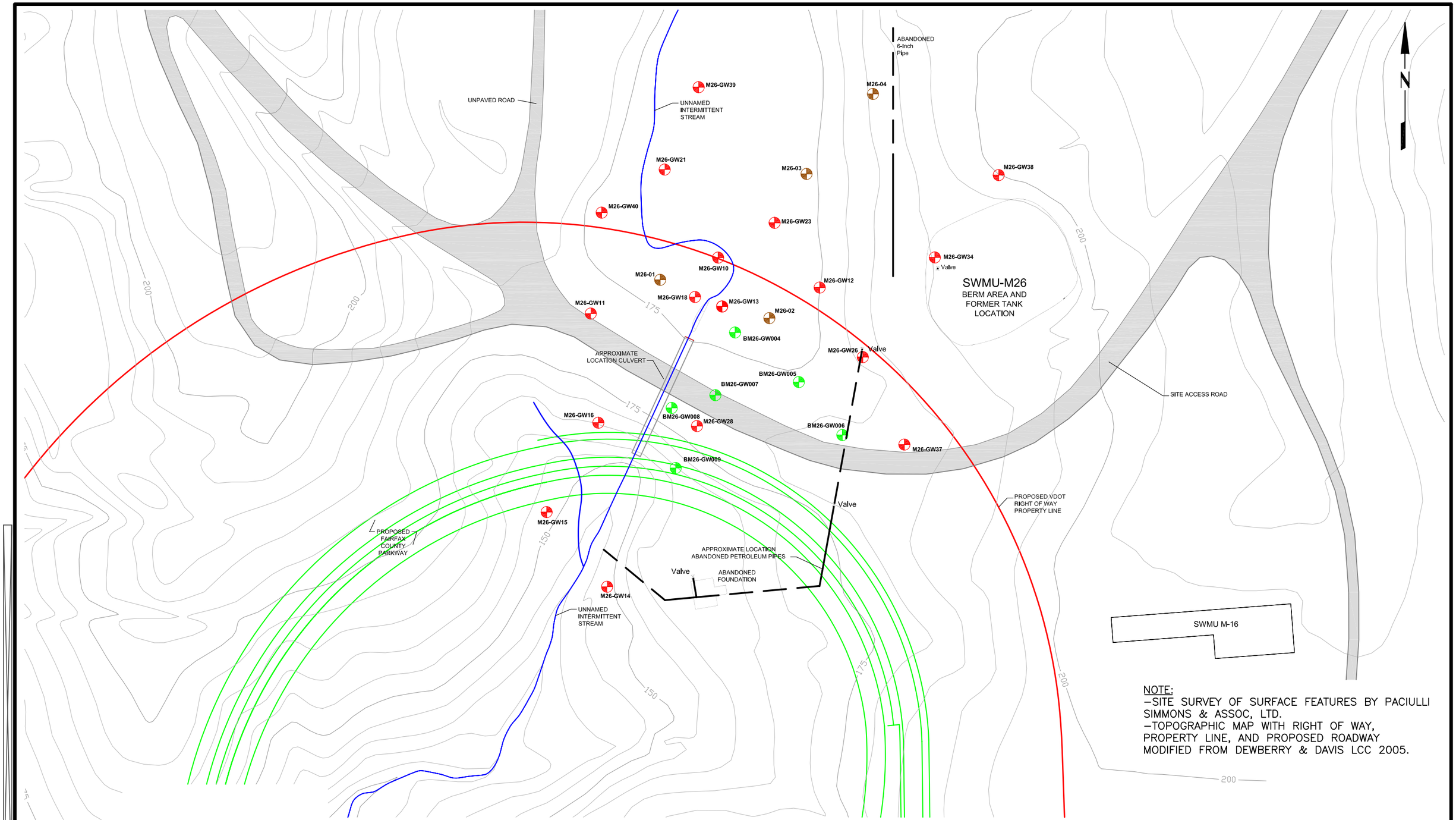
Engineer Proving Ground
Fort Belvoir, Virginia

TETRA TECH, INC.

Scale: 1" = 24,000

Figure 2

FIGURE 3
SOLID WASTE MANAGEMENT UNIT (SWMU) M-26
SITE CONFIGURATION



NOTE:
–SITE SURVEY OF SURFACE FEATURES BY PACIULLI SIMMONS & ASSOC, LTD.
–TOPOGRAPHIC MAP WITH RIGHT OF WAY, PROPERTY LINE, AND PROPOSED ROADWAY MODIFIED FROM DEWBERRY & DAVIS LCC 2005.

LEGEND

Approximate Monitoring Well Location

December 2001 | April 2005 | Sept 2005

0 40 80

Scale in feet

Engineer Proving Ground (EPG) SWMU M-26
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Figure 3
Site Configuration

TETRA TECH, INC.